

# CTB Seminar

10:00-11:00am, 13 Nov. 2015

## NOAA Climate Test Bed Seminar Series

### Speaker:

Dr. Yan Xue

Climate Prediction Center

NOAA/NWS/NCEP, College Park, MD

### Time:

10:00-11:00am, 13 November 2015

### Location:

NOAA Center for Weather and Climate

Prediction Conference Center

5830 University Research Court

College Park, MD 20740

### Remote Access:

[https://www1.gotomeeting.com/](https://www1.gotomeeting.com/join/714576893)

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Meeting ID: 714-576-893

Conference call: 1-877-680-3341

Passcode: 858747

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## Evaluation of Tropical Pacific Observing Systems Using NCEP and GFDL Ocean Data Assimilation Systems

The TAO/TRITON array is the cornerstone of the tropical Pacific and ENSO observing system. Motivated by the recent rapid decline of the TAO/TRITON array, the potential utility of TAO/TRITON was assessed for ENSO monitoring and prediction. The analysis focused on the period when observations from Argo floats were also available. We coordinated Observing System Experiments (OSEs) using the global ocean data assimilation system (GODAS) from the National Centers for Environmental Prediction and the ensemble coupled data assimilation (ECDA) from the Geophysical Fluid and Dynamical Laboratory for the period 2004-2011. Four OSE simulations were conducted with inclusion of different subsets of in situ profiles: all profiles (XBT, moorings, Argo), all except the moorings, all except the Argo and no profiles. For evaluation of the OSE simulations, we examined the mean bias, standard deviation (STD) difference, root-mean-square difference (RMSD) and anomaly correlation against observations and objective analyses.

Without assimilation of in situ observations, both GODAS and ECDA had large mean biases and RMSD in all variables. Assimilation of all in situ data significantly reduced mean biases and RMSD in all variables except zonal current at the equator. For GODAS, the mooring data is critical in constraining temperature in the eastern and northwestern tropical Pacific, while for ECDA both the mooring and Argo data is needed in constraining temperature in the western tropical Pacific. The Argo data is critical in constraining temperature in off-equatorial regions for both GODAS and ECDA. For constraining salinity, sea surface height and surface current analysis, the influence of Argo data was more pronounced. In addition, the salinity data from the TRITON buoys played an important role in constraining salinity in the western Pacific. GODAS was more sensitive to withholding Argo data in off-equatorial regions than ECDA because it relied on local observations to correct model biases and there were few XBT profiles in those regions. The results suggest that multiple ocean data assimilation systems should be used to assess sensitivity of ocean analyses to changes in the distribution of ocean observations to get more robust results that can guide the design of future tropical Pacific observing systems.

Details can be found in the paper below:

Xue, Y., C. Wen, X. Yang, D. Behringer, A. Kumar, G. Vecchi, A. Rosati, and R. Gudgel, 2015: Evaluation of tropical Pacific observing system using NCEP and GFDL ocean data assimilation systems. *Clim. Dyn.* 10.1007/s00382-015-2743-6.

